Fig. 1 - Prior art

Fig. 2 - Prior art

Fig. 3 - Prior art

Optimal sampling instant

$y(t)$

$y_I(m+4) = y(n+1)$

$y_I(m+3)$

△ ADC sample

○ Interpolated sample

$y_I(m+2)$

$y_I(m) = y(n)$

$y_I(m+1)$

t_{opt}

t

t_I t_I t_I t_I

t_s

Fig. 4 - Prior art

$y_I(k)$

$h(t-T_c)$

Middle sample
$m_I(k)$

$h(t)$

Early sample
$e_I(k)$

Late sample
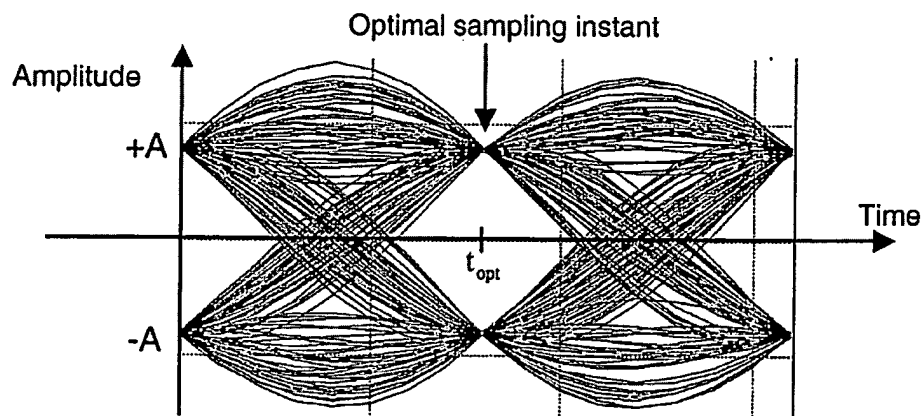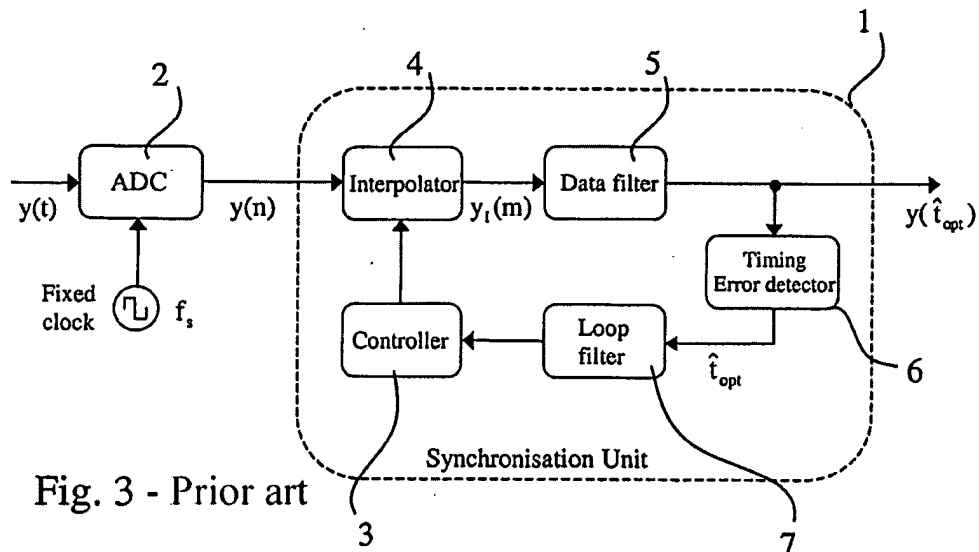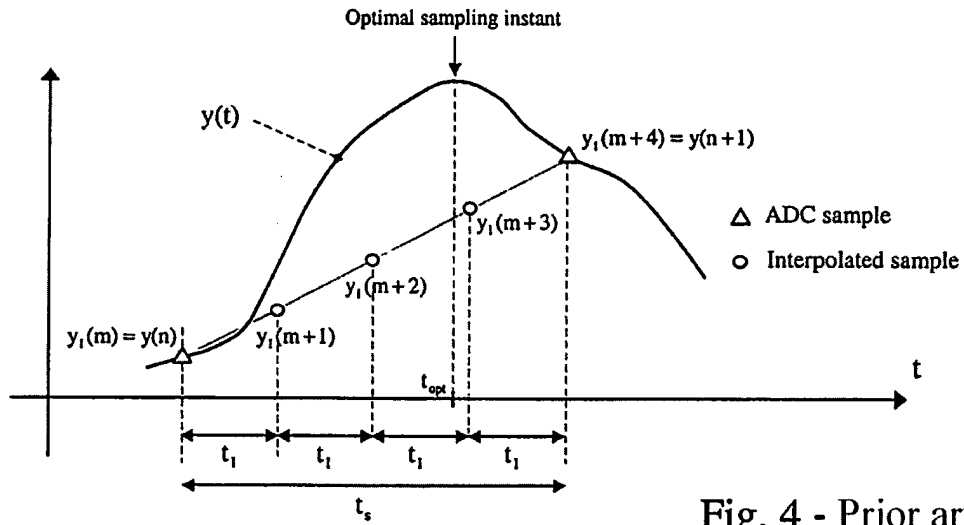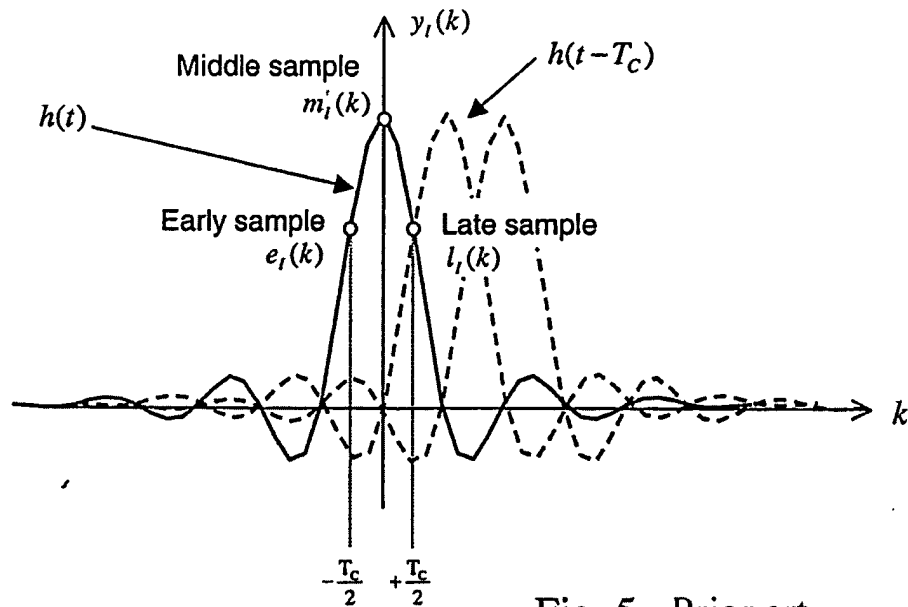$l_I(k)$

k

$-\dfrac{T_c}{2}$ $+\dfrac{T_c}{2}$
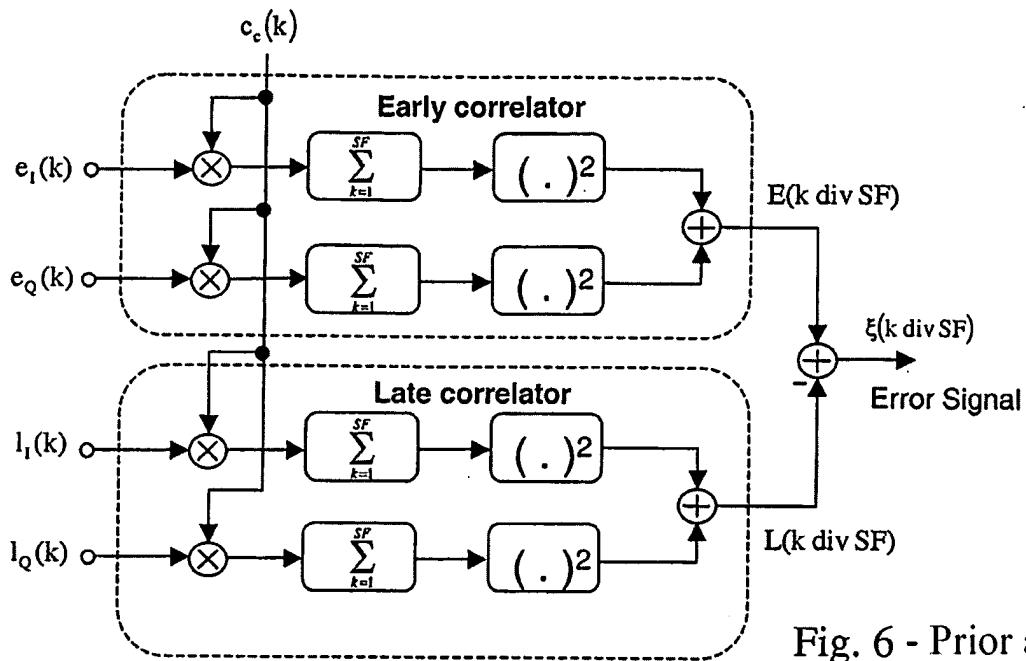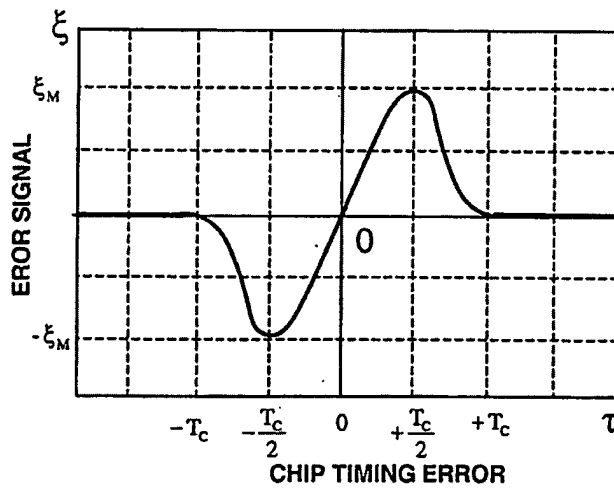
Fig. 5 - Prior art

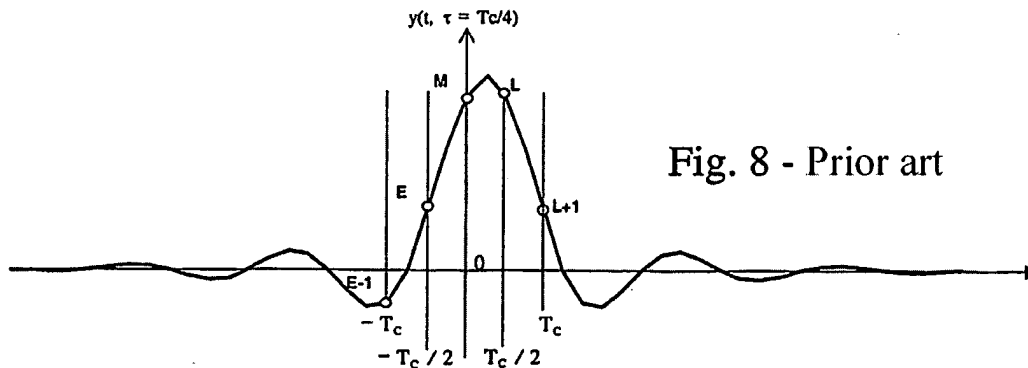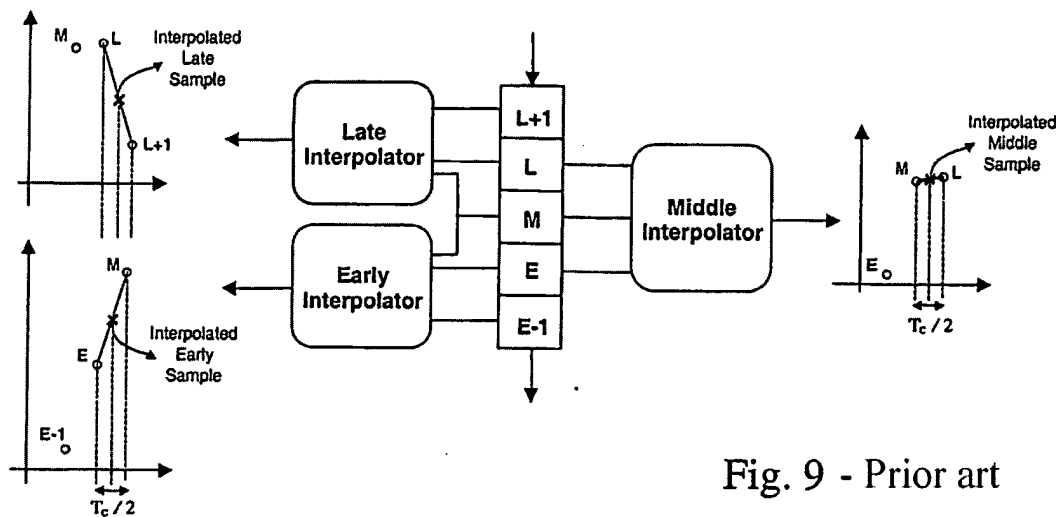Fig. 6 - Prior art

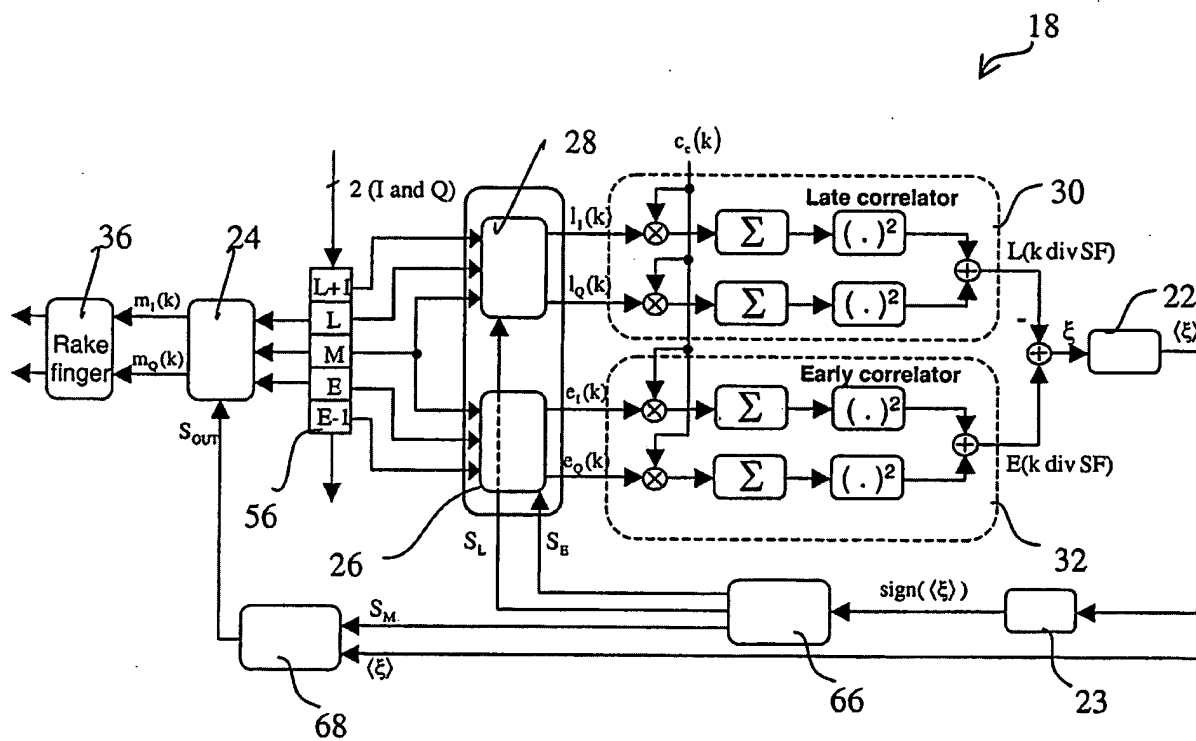
Fig. 7 - Prior art

Fig. 8 - Prior art

Fig. 9 - Prior art

Fig. 10

26, 28

y_L ○⟶

y_M ○⟶

y_E ○⟶

$y_{OUT} = f(y_E, y_M, y_L, SEL)$ ⟶

○
SEL

Fig. 11

56

E-1	E	M	L	L+1

$(k-1)\cdot T_c$ $\quad k\cdot T_c - \dfrac{T_c}{2}$ $\quad k\cdot T_c$ $\quad k\cdot T_c + \dfrac{T_c}{2}$ $\quad (k+1)\cdot T_c$

Time axis (t)

$\tau = -T_c/2$	$\Delta = T_c$
$\tau = -3\cdot T_c/8$	$\Delta = 3\cdot T_c/4$
$\tau = -T_c/4$	$\Delta = T_c$
$\tau = -T_c/8$	$\Delta = 3\cdot T_c/4$
$\tau = 0$	$\Delta = T_c$
$\tau = T_c/8$	$\Delta = 3\cdot T_c/4$
$\tau = +T_c/4$	$\Delta = T_c$
$\tau = +3\cdot T_c/8$	$\Delta = 3\cdot T_c/4$
$\tau = +T_c/2$	$\Delta = T_c$

Timing offset (τ)   50 $\dfrac{T_c}{8}$ 54   52
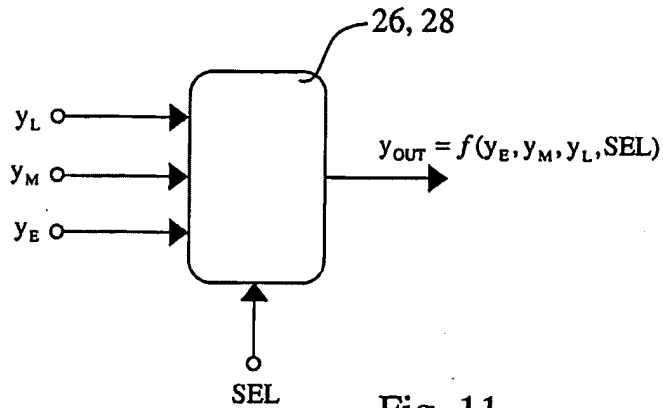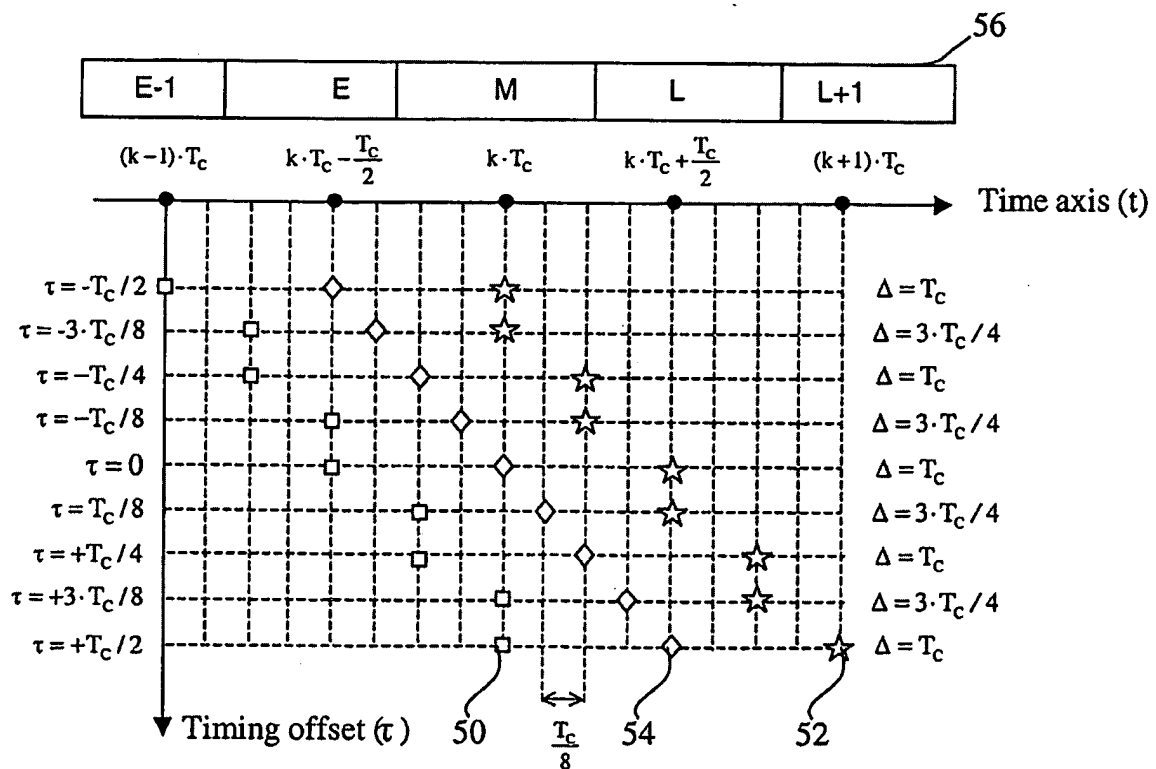
Fig. 12

SEL	Timing offset (τ)	$y_{OUT} = f(y_E, y_M, y_L, SEL)$
4	$-\dfrac{T_c}{2}$	$y_{OUT} = y_E$
3	$-\dfrac{3 \cdot T_c}{8}$	$y_{OUT} = \dfrac{y_M + 3 \cdot y_E}{4}$
2	$-\dfrac{T_c}{4}$	$y_{OUT} = \dfrac{y_M + y_E}{2}$
1	$-\dfrac{T_c}{8}$	$y_{OUT} = \dfrac{3 \cdot y_M + y_E}{4}$
0	0	$y_{OUT} = y_M$
-1	$\dfrac{T_c}{8}$	$y_{OUT} = \dfrac{y_L + 3 \cdot y_M}{4}$
-2	$\dfrac{T_c}{4}$	$y_{OUT} = \dfrac{y_L + y_M}{2}$
-3	$\dfrac{3 \cdot T_c}{8}$	$y_{OUT} = \dfrac{3 \cdot y_L + y_M}{4}$
-4	$\dfrac{T_c}{2}$	$y_{OUT} = y_L$

Fig. 13

SEL	Timing offset (τ)	$y_{OUT} = f(y_E, y_M, y_L, SEL)$
2	$-\dfrac{T_c}{2}$	$y_{OUT} = y_E$
1	$-\dfrac{T_c}{4}$	$y_{OUT} = \dfrac{y_M + y_E}{2}$
0	0	$y_{OUT} = y_M$
-1	$\dfrac{T_c}{4}$	$y_{OUT} = \dfrac{y_L + y_M}{2}$
-2	$\dfrac{T_c}{2}$	$y_{OUT} = y_L$

Fig. 14
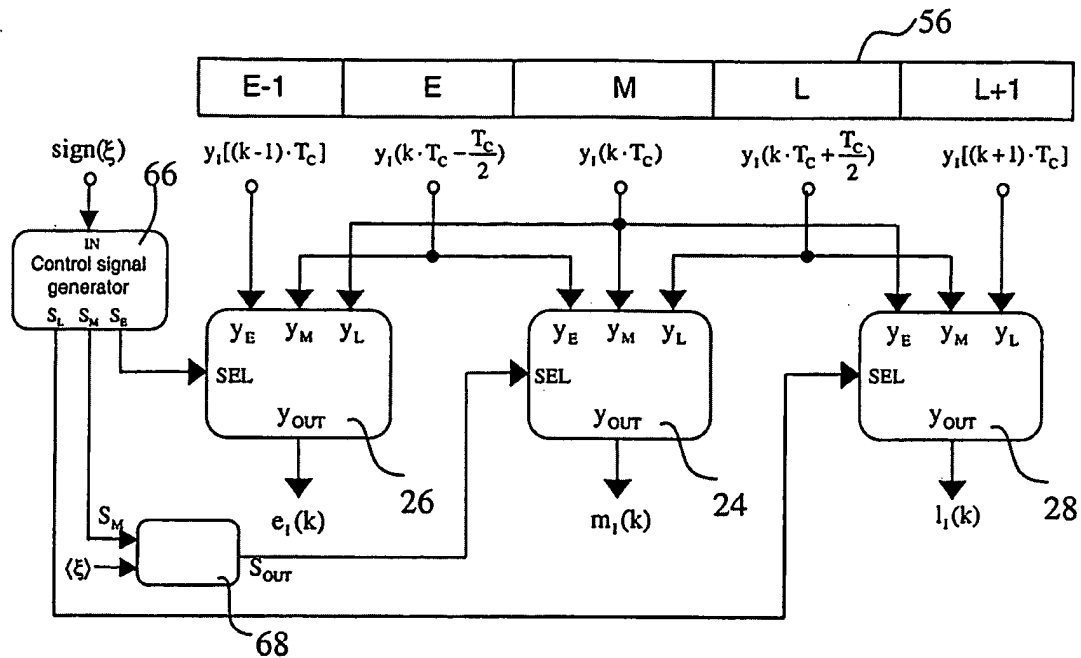
Fig. 15

Timing offset (τ)	S_E	S_M	S_L
$-T_C/2$	2	4	2
$-3 \cdot T_C/8$	1	3	2
$-T_C/4$	1	2	1
$-T_C/8$	0	1	1
0	0	0	0
$+T_C/8$	-1	-1	0
$+T_C/4$	-1	-2	-1
$+3 \cdot T_C/8$	-2	-3	-1
$+T_C/2$	-2	-4	-2

Fig. 16

Fig. 17